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Correspondence, conference threads and debate

Corrections

"Galilei Covariant Electrodynamics of Moving Media...", Apeiron 15:1-6

On page 2, in the paragraph before equation (8) "...with properties $\epsilon(\omega)$, $\mu = \mu_o$, absence of free..." should read "...with properties ϵ , $\mu = \mu_o$, absence of free...".
On page 3, after equation (19), "where $c(\omega) = \left[\mu_o \epsilon(\omega)\right]^{-1/2}$ is the phase velocity..." should read "where $c = \left(\mu_o \epsilon\right)^{-1/2}$ is the phase velocity..."
In equations (24) and (25), the refractive index "n" should not be in bold face.

"The Confrontation Between Relativity and the Principle of Reciprocal Action", Apeiron 15:1-6

Author's corrections to the article by Dr. S.X.K. Howusu entitled "The confrontation between relativity and the principle of reciprocal action" were received too late for inclusion in the publication. The revisions requested by Dr. Howusu are given here.
Page 7: The original abstract is replaced by the following text:

> *In this paper it is shown how Einstein's Theory of General Relativity violates the well-established Principle of Reciprocal Action by deriving the gravitational forces between a stationary and a rotating spherical body based on the equivalence principle of relativity—the Strong Equivalence Principle—and comparing them. Some implications of this fact are discussed.*

Page 9: After the statement of the Weak Equivalence Principle, insert the following text (replacing the first word of the next paragraph, "Thus,":

> *And the Law of General Gravitation is the natural extension of Newton's Law of Gravitation (which is well established experimentally for all rest masses, the only inertial masses known in Newton's day) by replacing the rest mass by today's complete experimentally known inertial masses of all particles. Thus, according to general gravitation, both rest and non-rest (motional) masses of all particles generate as well as experience gravitational fields. Consequently,...*

The final paragraph before the Appendix is replaced by:

> *Since, on the other hand, there is overwhelming experimental evidence for the Weak Equivalence Principle (Rindler 1977), and since its predictions are in perfect agreement with the well-established Principle of Reciprocal Action, the theory of Gravitation based on it—General Gravitation—may be a physically more natural and complete theory deserving serious attention. For it has already been shown (Howusu 1991) that the Theory of General Gravitation together with the Law of General Mechanics—the natural extension of Newton's Law of Mechanics—excellently duplicates all the experimentally established gravitational results in the solar system, such as the anomalous orbital precession and the deflection and redshift of light. And it may be complete enough to resolve all other outstanding gravitational problems, such as gravitational radiation and cosmological redshift, as well as meet all other philosophical requirements of a full gravitation theory.*

Appendix: Equation (A.1) should read as follows:

$$u = w_1 r_1 \sin\theta$$

Page 10, References: The reference to "Poster and Nightingale" should be "Foster and Nightingale".

"The Dichotomy of c", Apeiron 15:22-23

Figure 1: The lower set of arrows in the figure should point to the left.
Paragraph following Figure 1: "...while the effective total mass of gravitons in transit from the future direction is decreased by the time factor $c/(c+v)$."

"Conservation of Energy in a Static Universe", Apeiron 11:9-12

On page 11 of the above article, I published an incorrect formula for the magnitudes of quasars. In that paper, I supposed the radiation flux from quasars to be inversely proportional to the square of the distance. However, the empirical correlation for the number of quasars (Table 1) is

$$N(\leq z) = 4000\ k(z) \ln^2(1+z) = \frac{4000\ k(z)}{c^2} H^2 r^2$$

where z is the cosmological redshift, r is the distance, $k(z)$ is a selection coefficient, c is the velocity of light and H is Hubble's constant.

Table 1. Empirical correlation for the number of quasars (Hewitt and Burbidge 1987)

z	$N(\leq z)$	$4000\ln^2(1+z)$	$k(z)$
0.1	34	36	~1
0.2	136	133	~1
0.4	433	453	0.96
0.8	854	1382	0.62
1.6	1763	3652	0.48
3.2	3567	8238	0.43

Quasars probably have conic (for instance, disk) radiation (Figure 1). Both quasar radiation flux and the probability of discovery of quasars are inversely proportional to the distance.

$$E \propto \frac{1}{\ln(1+z)} = \frac{c}{Hr}$$

The correlation for magnitudes of quasars without consideration of emission lines (Tables 2 and 3) is

$$U,B,V \geq -2.5\log\frac{A_{UBV}}{\ln(1+z)} + K_{UBV}(z)$$

$$\equiv -2.5\log\frac{A_{UBV}}{(1+z)\ln(1+z)}$$

where $A_U = 2.86\cdot10^{-6}$, $A_B = 1.26\cdot10^{-6}$, $A_V = 1.7\cdot10^{-6}$ and $K_{UBV}(z)$ are *K*-corrections.

I wish to thank Dr. Toivo Jaakkola for discussions concerning the *K*-correction.

Table 2. Characteristics of bright quasars 3C 273, PKS 2344+09, 3C 454.3, PHL 1377 and PKS 0237-23 (Burbidge and Burbidge 1967)

z	U	(1)	B	(1)	V	(1)
0.158	12.16	11.9	13.01	12.8	12.8	12.5
0.677	15.62	13.7	16.22	14.6	15.97	14.3
0.859	15.91	14.0	16.57	14.9	16.1	14.6
1.436	15.72	14.7	16.61	15.6	16.46	15.3
2.223	16.17	15.3	16.78	16.2	16.63	15.9

Table 3. Characteristics of more bright quasars 3CR 273, OJ 287, 4C 29.45, TON 490, PKS 0237-23 and S5 (Hewitt and Burbidge 1987)

z	U	(1)	B	(1)	V	(1)
0.158	12.22	11.9	13.07	12.8	12.86	12.5
0.306	13.75	12.7	14.39	13.6	14	13.3
0.729	14.3	13.8	14.8	14.7	14.41	14.4
1.631	14.6	14.9	15.65	15.8	15.4	15.4
2.223	16.17	15.3	16.78	16.2	16.63	15.9
3.41	–	15.9	–	16.8	16.5	16.5

References

Burbidge, G. and Burbidge, M., 1967, *Quasi-Stellar Objects*, W.H. Freeman and Co.

Hewitt, A. and Burbidge, G., 1987, *Ap. J. Suppl.* 63:1.

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Research note

Experimental tests by Michelson-Gale, Hafele-Keating and Brillet-Hall have provided ample evidence (*cf.* Hayden, 1990) that the speed of light is affected by absolute motion, *i.e.*, that the constancy of light postulate, which is fundamental to Einstein's rejection of absolute motion, does not hold.

The absolute motion light-velocity dependence is introduced by a cosmological 'Body Alpha', called the Great Attractor in modern astrophysics. It can be seen with any stimulated energy circulation whose gyroscopic spin vector can be pointed toward or away from the Great Attractor's favored reference frame. Astrophysicist Nikolai Kozyrev was the first to demonstrate that even a mechanical gyroscope can serve as this energy circulation transducer (Dadayev 1990). Being parametrically vibrated in harmony with its reversible pseudoscalar rotation sensitizes a gyroscope's rundown speed to absolute motion entrainment. The corresponding gain or loss in kinetic weight, relative to the static, non-spinning, weight is revealed by the dimensionless ratio of pseudoscalar spin-energy to scalar mass-energy. This curvilinear measurement ratio is called the form factor. It was employed by Kozyrev to calculate the universal constant, C_2. It is noteworthy that Kozyrev's C_2 numeric required statistical analysis of full-cycle precession in both prograde and antigrade spin orientation. The numeric is double that obtained with a non-reversing Sagnac Effect ring-laser gyro where $C_2/2$ has been most accurately measured using the unique coherence-length interference analyzer invented by Dr. Silvertooth.

Nonzero vacuum energy fluctuations make impedance energy-density-dependent, far from thermodynamic equilibrium. In its simplest sense, impedance is the square-root of the quotient of magnetic permeability and electric permittivity. In a deeper sense, the measurements associated with each of these qualities require the use of two different measurement gauges which involve two kinds of time and two kinds of multiplication. Only the 'Absolute System' of standards and measurement clearly resolves this curvilinear measurement conflict. It must be made clear that one can no longer use the "practical" SI system without burdensome conversion. Furthermore, it is very insightful to reconsider the use of both Metric and English units of length, since the centimeter and inch are fundamentally related by the circular-resonator equation developed by Hertz. In short,

dimensions given in feet relate the equilibrium surface-wave speed (C_1) in nanoseconds.

My microwave circulation experiment combines a number of common elements in an apparently uncommon way. The key element is a simple magnetic shock wave generator that produces the immediate action-at-a-distance vector potential whose informational energy is inversely proportional to distance. In contradistinction, light-speed-limited radiant energy is inversely proportional to the distance cubed. Nonlocal action statistics are affected by both radiation (energy) and information (phase). When the cohering vector potential's geometric-phase or information-energy contribution equals the absolute motion vacuum-energy contribution, the light-speed-delayed radiant energy has become insignificant. Experimental verification of gyromagnetic energy gain requires a well defined scalar-transition into the vector potential which can be achieved by closing a super-fast picosecond rise-time switch, provided the initial scalar potential is large enough to create a 3000 V/mm shock wave. To measure such far from thermodynamic equilibrium phenomena requires the 'Absolute System' of fine-grained standards and statistical analysis, including the curvilinear ratio of effective-value to mean-value numerics (*i.e.*, the geometric form factor). The needed current-circulation transducer can be an instrumented G-line oval with the two circulation foci at different elevations. The east-west circulation best couples tothe earth's absolute motion gain.

I am only aware of three techniques to produce the required magnetic shock wave stimulation. The two commercially interesting techniques involve phase-conjugate-resonance. This requires near loss-free adiabatic circulation to attain the energy gradient needed to compound the auto-parametric impedance that will assure harmonic convergence. The simplest technique to produce faster-than-light magnetic shock waves is to create a super-fast scalar-transition using Nikola Tesla's hydrogen pinched liquid mercury spark gap. Only a pristine mercury meniscus will automatically provide the ideal field-emission surface having uniform positive curvature down to atomic dimensions. Offsetting the advantage of its repeatable < 20ps current rise, available mercury spark switches have a very low repetition rate. This complicates gyromagnetic gain demonstrations by requiring a light amplifying, microchannel-plate oscilloscope to detect extreme low duty cycle magnetic vector potential effects. An equally simple magnetic shock wave detector employs the inner-dielectric atomic-memory of a coaxial cable used as a 'G-line' current circulator. In an independently published report of my 1988 public demonstration, the "dielectric signal foot" appeared 36 nanoseconds before the coaxial-cable-delayed "clock" signal (Pappas 1988).

The need for military countermeasure gigawatt pulse-power technology has since produced high repetition-rate picosecond rise-time switches. They are based on the fact that a photoconducting reverse biased diode can be laser triggered. This can provide a peak-current rise approaching the hydrogen pinched mercury spark with repetition rates orders of magnitude larger than the Tektronix model 109 mercury-switch pulser. I have found that selected photoconducting diodes can self-trigger in a low duty-cycle avalanche discharge. This eliminates the laser trigger complexity but allows GHz band-width sampling oscilloscopes that feature digital signal processing (DSP) for automatic statistical analysis. With an appropriate circulating-current form factor transducer and the correct scale multipliers, DSP analysis can provide the needed scalar and pseudoscalar numerics for absolute ratio measurements. My study is geared to reveal how efficiently a magnetic shock wave can produce the vector potential needed to cohere an atomic electron's free gyromagnetic energy.

My microwave version of Michelson's stationary Sagnac Effect circulator is made geometrically symmetric in the east-west vertical plane to eliminate confusing cyclic variations. As the earth spins, it rotates about its attractor, the sun which rotates about its attractor, the Great Annihilator which is the absolute motion displaced center of our rotating galaxy—itself is part of a super-galactic system of coherent absolute motion about a common Body Alpha, now identified as the Great Attractor. The dominant current-circulation vector can either point toward or away from the Great Attractor. This arrangement allows gyromagnetic

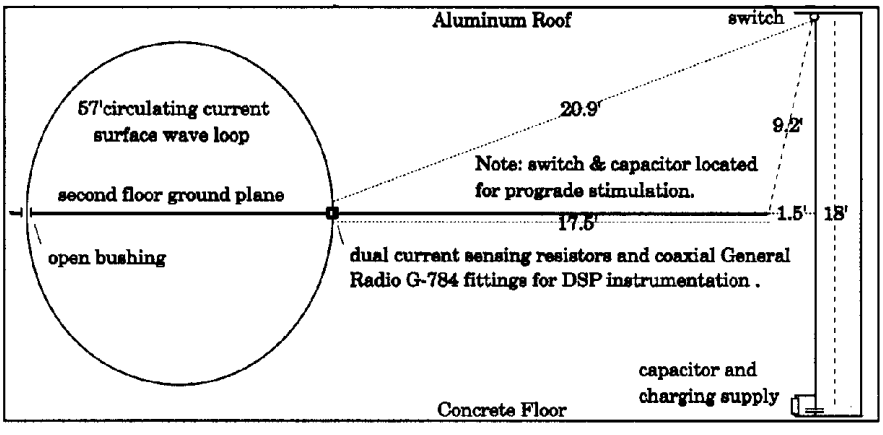

Figure 1. Circuit drawing

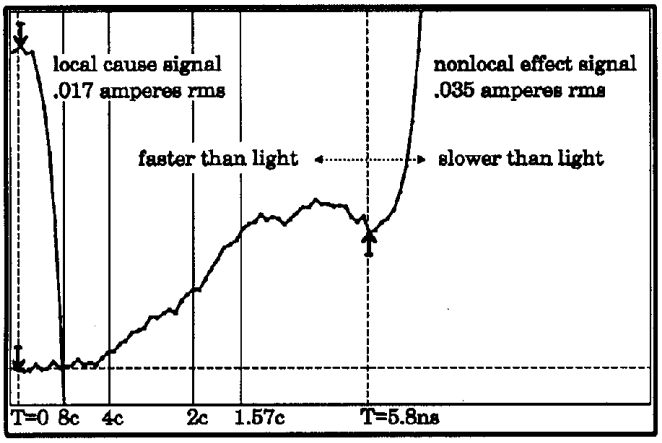

Figure 2. Prograde stimulation

current gain, non-locality and non-equilibrium causality to be studied in the preferred reference frame of the Great Attractor.

A description begins with the scalar-transition vertical magnetic shock wave stimulator. It employs a 2 meg ohm 1000V charging supply in parallel with a 32pF impulse capacitor which is connected in series with the G-line surface wave guide invented by Dr. Goubau (Goubau 1950). The top end of this charged 18' G-line is connected to the lab's metal roof through an 800V avalanche-diode switch that periodically commutates the 32pF charge through the G-line's nonlinear reactance. A super-fast scalar-transition avalanche creates light-velocity shock waves on the G-line which pass through a 6' × 8' hole in the lab's first floor metal ceiling. A microwave reflector is provided by a 28" × 30' seamless aluminum sheet that runs from the first floor 32pF capacitor up the west-facing wall to a roof mounted avalanche-diode switch. (The capacitor and switch positions are interchanged for the antigrade stimulation, gyromagnetic loss tests.) Running down the center of the lab's 50' × 100' first-floor metal ceiling, two General Radio G-874 RF isolation bushings penetrate this otherwise continuous ground-plane at locations 19' and 33' east from the vertical 18' G-line stimulator. The G-874 coaxial-fitting bushings allow radiated RF isolation while allowing physical contact between the top and bottom loops of the 57' circumference G-line circulator. The 800V scalar-transition potential, its18' G-line wave stimulator and its 19' remote location simplify instrumentation by providing <2V signals into standard 50 ohm, discoidal, radially grounded, current sensing resistors arranged to sense the top and bottom cavity influence on this 57' G-line "ring-gyro" absolute motion transducer. (Since the DC-1Ghz current probes actually protrude 2" above and below the central ground-plane, current measurements must differ in absolute time by 1/3 nanosecond.) Identical GR-874 series fittings assure true time correlated signal ports into the up and downstairs isolated microwave cavities, when the 10GHz air core transmission-lines connecting the 10G/s RIS two-channel oscilloscope are perpendicular to the circulation loop and hug the ground plane. The long-standing problem of achieving greater than 60Db (1000 ×) radiant signal isolation between opposing loops of this circulating-current transducer was solved by simply splitting it into identical half-loops, one above the other, so only the conducted surface wave currents can pass through these General Radio bushings. The lower cavity loop drops 8' below the second floor ground-plane, while the upper cavity loop arcs 8' above it. Differential G-line/ground-plane circulation can be augmented by increasing the 33'-remote GR bushing to G-line capacity, since the first, 19'-remote bushing has grounded the loop through itsup and downstairs current sensing resistors.

The circuit diagram in Figure 1 shows that for both prograde and antigrade stimulation, the direct light path to the "locality cavity" detector is always 20.9', 5.8' closer than the compound light path of 9.2'+17.5' to the "non-local" cavity detector. Figures 2 and 3 provide a 50 × current and 10 × time expansion of the leading edge portions of the displayed rms full-cycle energy, for both the local and non-local signals. Figures 2 and 3 help visualize Einstein's non-locality "paradox" using the Kozyrev system to demonstrate the partial causality-inversion ue to absolute motion entrainment. In the Microwave domain, the absolute speed of light statistics can be compared with the absolute cause and effect rms statistics. Figure 2 confirms that despite the 5.8 nanosecond light-path difference, the "effect" current is seen immediately with respect to its local "cause" current. Since it slows down to light speed, the mean velocity of the evanescent shock wave signal appears faster than the equilibrium light-speed C_l by aratio of $\pi/2$ or 4.7124×10^{10} cm/s. This was Nikola Tesla's claim in his US Patent application made five years before Einstein's famous 1905 theory. The popular acceptance of Einstein theory banned absolute motion gain and influenced the US Patent Office to reject Tesla's superluminal communication and gyromagnetic energy invention. It is noteworthy that 6 months after Tesla died, in 1943, the US Supreme Court invalidated the Mar-

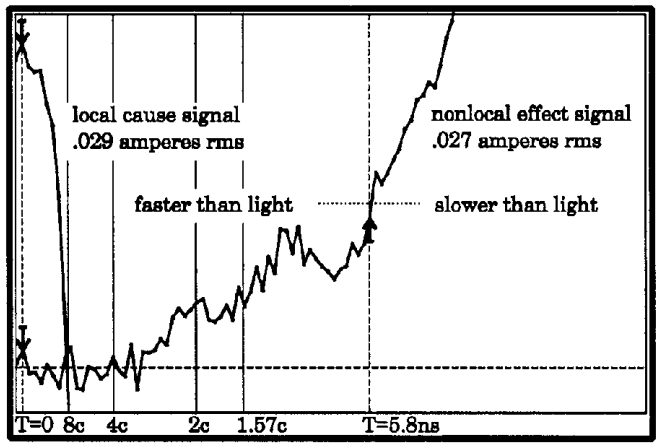

Figure 3. Antigrade stimulation

coni patents which were based on Tesla's 1/4 wave resonant Magnifying Inductor disclosures (Tesla 1943).

Tesla's apparent discovery of the earth's natural gyromagnetic current gain anticipated Kozyrev's discovery of the universal constant C_2. Consider the fact that Tesla's non-dispersive energy-resonant "Magnifying Inductor" gain becomes a dispersive frequency-resonant loss when the magnetic shock-wave stimulation is antigrade. (The 57' G-line current-circulation vector reverses when the scalar-transition is initiated downstairs.) With this antigrade stimulation, the nonlocal or upstairs statistics show degenerate dispersion and energy dissipation compared to the local causative-current statistics of the downstairs signal. This is in keeping with the reported light-speed delay and energy dispersion seen in all frequency-resonant circuits. Numerous non-local magnetic shock wave experiments show that the vector potential's "information-energy" (*i.e.* the geometric phase) decays inversely with distance, whereas the radiant heat-energy decays inversely with the distance cubed.

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Speculation in Science and Myth

Perusal of the comments (Publisher 1993) has led me to present my views on some epistemological problems. Let me first correct a printing error and misunderstanding of the alternative cosmological model. The initial diameter should read 10^8 cm, and it should be noted that the big-bang singularity is not replaced by a primordial finite region of space possessing homogeneous fundamental energy. The proposed model postulates continuous conversion of fundamental energy to manifest universe, *i.e.* there is no parallel with big-bang creation. To illustrate this, let us take the example of freezing of a volume of water. Metaphorically representing superspace with water, and ice with the manifest universe one can identify transformation of one state into another as creation, and increasing volume of ice with the expansion of the universe.

Hawking and Alfven unjustifiably involve God in their arguments. Ironically, this is not a new thing: Newton and Einstein frequently referred to God in their discourses on science. Weyl's reluctance 'to accuse God of mathematical inconsistency' and Einstein's response that 'it seemed to him as bad to accuse God of a theoretical physics that did not do justice to human observations' are typical examples. In discussions with Einstein, Bohr advised for utmost caution in ascribing attributes to Providence in everyday language. It is equally intriguing that an atheist devotes much of his life inventing arguments disproving the existence of God, whereas a true believer does not even attempt any proof of God's existence. A careful study shows that while Newton's recourse to God indicates humility and confession of ignorance, in this century some scientists have often attributed to God what are their own thoughts and that, too, with a sense of arrogance. I think there is no need to invoke God in a scientific discussion.

Any dogmatism is bad in science, be it that of the science establishment or anti-Einsteinians. Usually an idea which differs from accepted standard theories is termed speculative, and forgetting the humble speculative origin of standard theories, such ideas are treated with disdain. The role of speculation in a scientific theory, however, merits a careful study.

There are several technical and logical problems in Einstein's general theory of relativity (GTR), but to blame Einstein for the present fanciful world of science is unreasonable. Quantum mechanics is incomplete according to him, and field sincgularities and the *ad hoc* nature of the energy-momentum term in field equations constantly worried him. He unsuccessfully sought a geometrical unification of gravitation and electromagnetism in later years of his life. The preface to Synge 's book (Synge 1960) reflects the status of the GTR amongst physicists around that period. It was the discovery of microwave background radiation in 1965 which revived interest in the GTR, and subsequently particle physicists encouraged by unified gauge theories brought together the sub-atomic world and the universe. The early universe in big-bang cosmology has become a laboratory to test their ideas, and ignoring many fundamental problems, the theory of everything has been proclaimed.

How can one hold Einstein responsible for this. In fact, we must acknowledge that GTR inspired many minds to pursue the finest of the intellectual efforts in mathematical physics.

The laws in science are founded on the belief of harmony and simplicity in nature, though one could hold a contrary view that nature is complex. Such beliefs are undecidable logically, but right from the time of Newton the belief in the former has proved to be fruitful. The role of hypotheses and empirical observations has been analysed

in great detail by Poincaré. In a recent contribution to Poincaré's philosophy, I have attempted to decipher the metaphysical elements in science (Tiwari 1992). It has been pointed out that the only directly observable quantity is spatial relation (*e.g.* position of a pointer on meter scale), and the act of observation is counting with reference to a defined standard scale. All other physical observables are convenient constructs. Though design of experimental setup and collection of empirical data also require intellectual effort, to discover universal laws from this limited empirical information belongs to intuition. There is no theory without speculation, and nevitably some metaphysical elements arise in science. One of the roles of epistemology is to identify such unobservable metaphysical elements so that science is not mystified. Absolute time in Newtonian theory is an example of such a metaphysical concept. In cosmology one has a peculiar problem: the object of study, *i.e.* the universe itself, is beyond observation. Any model of the universe is necessarily speculative.

When science becomes myth (*e.g.* QED, big-bang cosmology), valid and constructive criticisms are relegated to the background; at the same time, inspired by popular expositions of scientific theories, some critiques based on misconceptions also arise. Both are detrimental to science. Why does science acquire a mythical form? Why is a profound thinker like Poincaré is less known than Einstein — why amongst the trio of Bondi, Gold and Hoyle only the last one has come into the limelight. Why did Jayant Narlikar win instant fame in India for his work on the steady-state theory? Why Hawking amongst many equally competent physicists has become a legend in his life-time? I think these questions may be closely related, and deserve attention. It seems that forgetting human origin of scientific theories, these are accorded absolute reality, and some scientists create a mysterious aura to such theories. Science becomes a myth to be overthrown by another revolutionary scientific theory, and this process continues. A rationial, modest and socially responsible approach together with the elimination of what I have termed as "superfluous unobservables" (Tiwari 1992) in a scientific theory could perhaps keep science as science without in any way denigrating speculation.

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From the Publisher's notebook

A partisan of the middle road, Dr. Tiwari practices moderation in all things. His primordial fundamental energy is delivered rolled up in a package that is neither too big nor too small; then, upon a signal from some impartial hand, it quietly transforms itself (without the distress of an explosion) into "manifest universe". His agnosticism compels him to frown on any reference to God, pro or con, in scientific circles: Alvén should thus abstain from his intemperate polemic against the metaphysics behind the Big Bang creation. Speculation, the agreeable antithesis of dogma, is to be tolerated, but only so long as it eschews the metaphysical "superfluous unobservables" which open the door to mythmaking ("fundamental energy" is mysteriously exempt from this prohibition).

We cannot subscribe to Dr. Tiwari's remedy for the mystified condition of science in the twentieth century, for the simple reason that his "rational, modest and socially responsible approach" amounts to an appeal to a wholly reckless, unscientific "intuition". This is not the place for disquisitions on problems of epistemology. However, for the benefit of our readers, it might be appropriate to dwell upon the metaphysics behind special relativity. We will demonstrate that it is quite reasonable to hold Einstein to task for the present "fanciful" world of science.

We most certainly agree with the assertion that "there are several technical and logical problems in Einstein's general theory of relativity." We would hasten to add that, because Einstein's special relativity suffers from equally serious contradictions (*cf.* articles by Dr. Mocanu and Drs. Shaozhi and Xiangqun in this issue), the Einstein relativistic worldview is tantamount to a return to mysticism. The article by Drs. Shaozhi and Xiangqun clearly shows that the relativity of simultaneity, as conceived by Einstein, is unacceptable, and that any theory constructed upon this premise can only describe appearances, not an objective reality, which is the proper subject of physics. What lies at the root of the relativity of simultaneity construct is a definition of time at which Einstein certainly arrived by no more than intuition.

Newton, in defining absolute, true, mathematical time that "of itself, and from its own nature, flows equably without relation to anything external, and by another name is called duration", was careful to contrast it to relative, apparent, common time, "the measure of duration by the means of motion", since evidently absolute and relative cannot exist independently of one another. Einstein, in his 1905 paper, develops the relativity of simultaneity construct by discarding the absolute aspect and generalizing the relative aspect. It is from this one-sided "proper" time that all the horrors of special relativity spring. (It is interesting that Newton cautioned against such a lapse of scientific rigour in definitions when he complained that "those violate the accuracy of language, which ought to kept precise, who interpret [the names time, space, place and motion] for the measured quantities.")

One of these horrors, the clock (or "twins") paradox, has stalked Einstein relativists like a poltergeist. It was unleashed upon the world in the same 1905 paper, in the section where Einstein explains the physical meaning of his new theory and the transformations he has derived. He speaks of how bodies "appear" to be shortened, and clocks "appear" to mark time more slowly when "viewed" from a system relative to which they are in motion. Evidently, appearances only are involved, and Einstein as yet makes no claims concerning the physical properties of the clocks. If there is no preferred reference frame, the situation is perfectly symmetrical: "the same results hold good of bodies at rest in the 'stationary' system, viewed from a system in uniform motion". All this would be consistent with any theory in which light signals have finite (*N.B.* not necessarily constant) velocities.

However, just as he earlier confused absolute time with relative time, he suddenly confuses appearance with reality, introducing asymmetrical, *i.e.* real physical effects:

> *If at the points A and B of K there are stationary clocks which, viewed in the stationary system, are synchronous; and if the clock A is moved with the velocity v along the line AB to B, then on its arrival at B the two clocks no longer synchronize, but the clock moved from A to B lags behind the other...It is at once apparent that this result still holds good if the clock moves from A to B in any polygonal line, and also when the points A and B coincide. If we assume that the result proved for a polygonal line is also valid for a continuously curved line, we arrive at this result: If one of two synchronous clocks at A is moved in a closed curve with constant velocity until it returns to A,... then by the clock which has remained at rest the traveled clock on its arrival at A will be ... slow.*

As long as appearances only are involved, the choice of which rest frame should be designated "stationary" is irrelevant: the result is symmetrical, and holds good equally for clocks in the moving system viewed from the stationary system, and clocks in the stationary system viewed from the moving system. Now, without explanation or pretext, the symmetry is abolished. Whereas previously, there was only relative motion between clocks, now one clock may be singled out (with what justification?) as stationary, *i.e.* in a preferred rest frame. With this sleight of hand, what was formerly only the externally apparent clock rate is transformed into an internal, physical property of the clock. Paradox indeed!

This is the "fanciful" logic which drives the world of Einstein. Newton's dialectical unity of absolute and relative time is broken asunder; relative time is raised to absoluteness, and then, on the sly, relative time is replaced by an absolute time that lacks the precise definition of its Newtonian predecessor. A world built by such logic can only end in ruin.

Of course, the great irony is that experiments with moving clocks are indeed asymmetrical. Yet this effect obviously cannot be interpreted as support of the special theory of relativity, which, due to its postulates, leads to a symmetrical situation. The behavior of moving clocks (and particles) must be understood as due to other causes, such as the internal structure of the particles, the nature of the light medium (ether, vacuum), the interaction between particles and the vacuum. Where symmetrical effects are found to occur, the result may be in accordance with the predictions of the Lorentz transformation. However, my late friend Jacques Trempe has showed (*Apeiron* 8:1) that the constancy of light postulate can be discarded, and consequently the same effects are possible in Galilean space and time. As Petr Beckmann wrote in his book *Einstein Plus One*:

> *To summarize: the experimental evidence on alleged time dilation overlooks the crucial issue; is it time or the clock that is affected? It is a special case of a more fundamental question: should physics seek to understand objective reality or should it describe an observer's perceptions?*

The question then remains: what is the significance of the Lorentz transformation? It appears to emerge from different sets of conditions, but we may begin to answer the question by appealing to the original text of 1905 by Einstein. We read:

> *All problems in the optics of moving bodies can be solved by the method here employed. What is essential is that the electric and magnetic force of the light which is influenced by a moving body be transformed into a system of coordinates at rest relatively to the body. By this means all problems in the optics of moving bodies will be reduced to a series of problems in the optics of stationary bodies.*

Einstein states that his method consists in eliminating the inconveniences introduced by moving bodies by reformulating problems so that they be solved in a stationary system. This is achieved by arbitrarily normalizing the speed of light, which may be finite but not constant, to one value, c, in all frames, which has the effect of transforming the forces or signals into a system of coordinates which is at rest relative to a moving body. Normalization of light velocity to a constant value is thus no more than a mathematical shortcut, which unfortunately obscures the actual physics of the situation.

A second possible source of the Lorentz transformation was brought to my attention by Adolphe Martin. It has to do with the compressibility of the medium through which objects (particles, light waves) move, and can be illustrated by means of analogy with the field of aerodynamics.

In the early decades of this century, the discipline of aerodynamics was reaching maturity. By around 1920, the problem of supersonic flight was being addressed, at least in theory, by engineers working in Germany. At speeds approaching the velocity of sound, the compressibility of air causes significant increases of drag and unstable flow in straight airfoil designs. Standard methods of calculating the properties of foils that would provide the right properties of lift broke down near the speed of sound, so a method was sought for facilitating airfoil design in the presence of compressibility. The resulting method consists in applying a factor, known as the Prandtl-Glauert Transformation, to the chord of the wing. This factor was originally derived by Prandtl in 1918 (apparently), and it is defined as the root of [1-(mainstream velocity/velocity of sound in mainstream)squared], or $\sqrt{1-M^2}$, M being the Mach number. The factor is applied to a wing in order to calculate a flow pattern in a compressible gas by normalizing the wing to a larger chord in an incompressible gas. (Robert T. Jones, *Wing Theory*, Princeton, 1990, W.F. Hilton, *High Speed Aerodynamics*, Longmans, 1951.)

It is amusing to note that aerodynamics engineers have apparently also been tempted to draw "relativistic" conclusions from the Prandtl-Glauert transformation. One writer warns his readers thus:

> *This concept of compressibility factors has proved so powerful that we tend to think in these terms as though they expressed some physical quality of these flows. Thus, rather too easily, we tend to regard pressure distributions in compressible flow as scaled-up or stretched versions of those in incompressible flow. (D. Kuechemann,* The Aerodynamic Design of Aircraft, *Pergamon, 1978.)*

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